

Diabetes In India
“The Bitter Sweet Nightmare”

Amrish Mithal

Non-communicable diseases cause 61% of deaths in India: WHO report

Cardiovascular Diseases Most Lethal Killers

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New Delhi: Nearly 61% of deaths in India are now attributed to non-communicable diseases (NCDs), including heart disorders, cancer and diabetes, according to data released by the World Health Organisation (WHO) on Monday. Almost 23% of the population is at risk of premature death due to such diseases.

The UN agency has warned countries, including India, against premature deaths caused by NCDs and said governments must immediately step up efforts to tackle them. "Limited na-

58 LAKH DIE DUE TO NCDs IN INDIA

Non-communicable diseases (NCDs) like cancer, diabetes and cardiovascular diseases are the leading global cause of death and are responsible for 70% of deaths worldwide

THE INDIA PICTURE

In India, **61%** of deaths are from non-communicable diseases

58.17 lakh Total number of NCD deaths in India



23% At risk of premature death from NCDs in India

Cancer, diabetes and heart diseases account for 55% of the premature mortality in India in the age group of 30-69 years

tional progress has been made in the fight against NCDs — primarily cardiovascular and chronic respiratory diseases, cancers and diabetes — which are the world's biggest killers, and claim the lives of 15 million people aged 30 to 70 years annually," the WHO said.

According to the data,

NCDs are responsible for 70% of deaths worldwide. In India, diseases like cancer, diabetes and heart problems were estimated to have killed a total of 58,17,000 people in 2016. While the percentage of deaths from NCDs is still lower in India as compared to many other countries, experts are concerned the burden is rapidly increas-

ing because of changing lifestyles and factors like pollution, and tobacco and alcohol consumption.

Four risk factors responsible for a significant proportion of these diseases are tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol. The major metabolic risk factors are obesity, raised blood pressure, raised blood glucose and raised blood cholesterol levels, the report says.

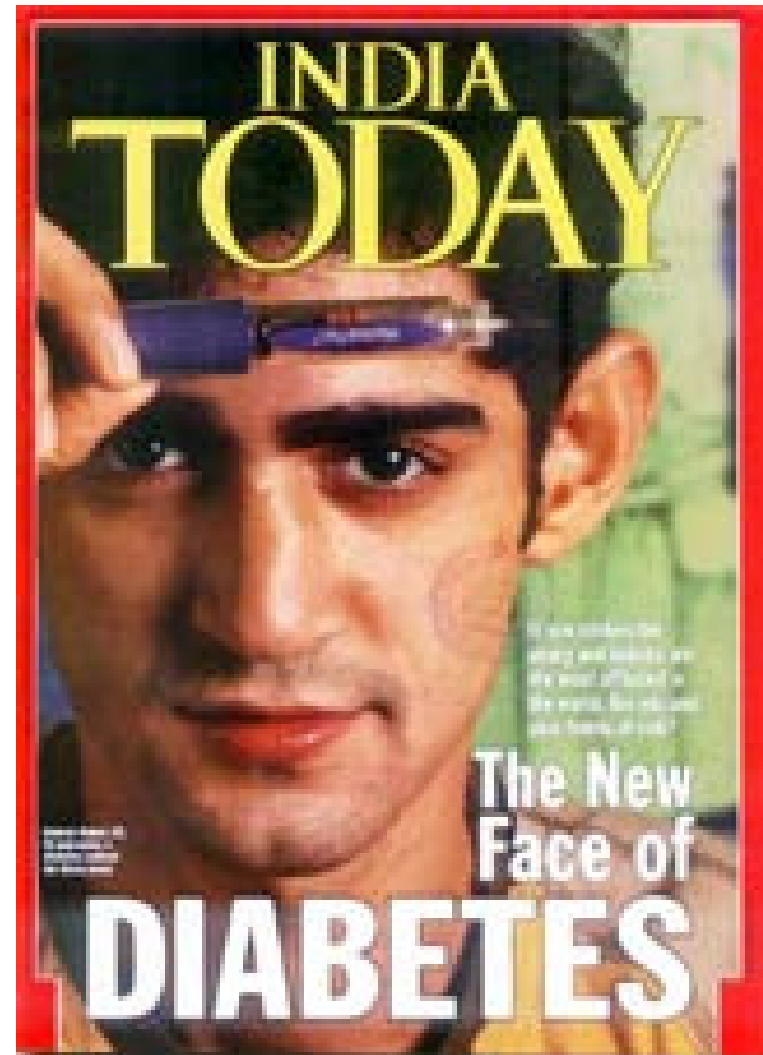
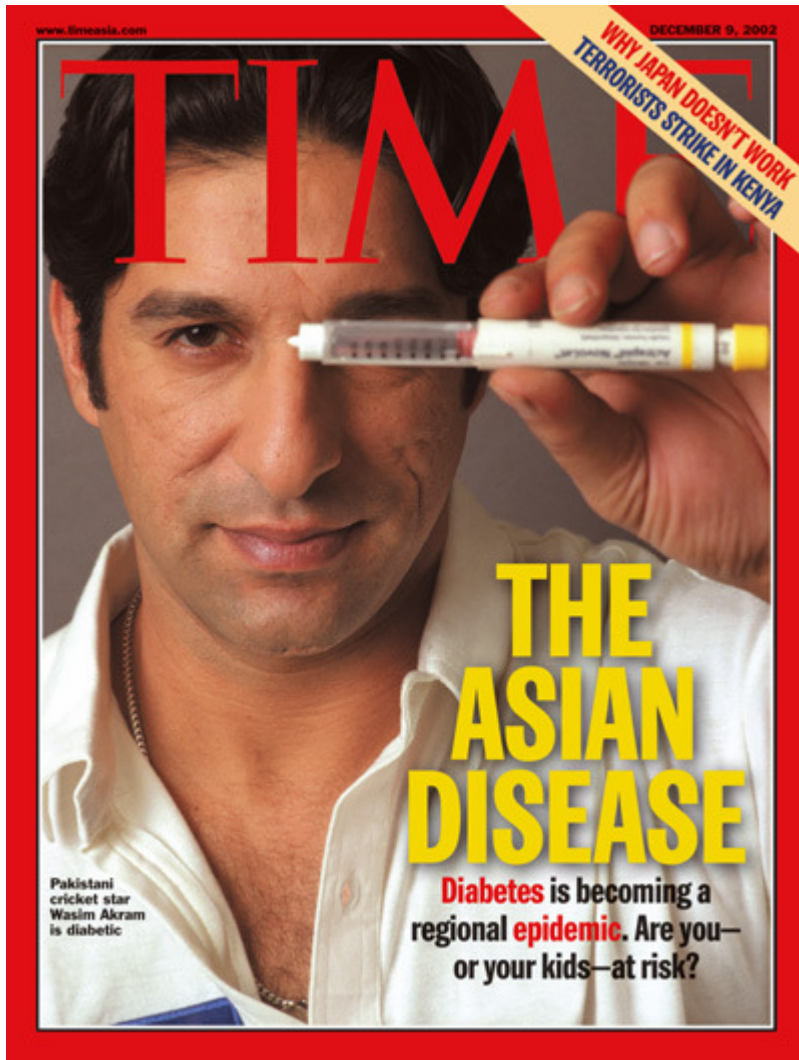
Cardiovascular diseases (coronary heart disease, stroke, and hypertension) contribute to 45% of all NCD deaths, followed by chronic respiratory disease (22%), cancer (12%) and diabetes (3%).

Cancer, diabetes and heart diseases alone account for 55% of all premature deaths in India in the age group of 30-69 years.

"Bolder political action is

needed to address constraints in controlling NCDs, including the mobilisation of domestic and external resources and safeguarding communities from interference by powerful economic operators," said Tedros Adhanom Ghebreyesus, director-general of WHO.

Of late, the health ministry has initiated several measures to tackle the increasing burden of NCDs. For instance, the ministry has started a massive free door-to-door screening programme for early detection of cancer, heart disorders and diabetes. The programme flagged off in February, aim to cover 200 districts by 2018. The government has also started schemes to set up cancer centres across the country. While 31 such hospitals have already been built, more are to be set up by 2020.



Is NCD a global crisis? YES!

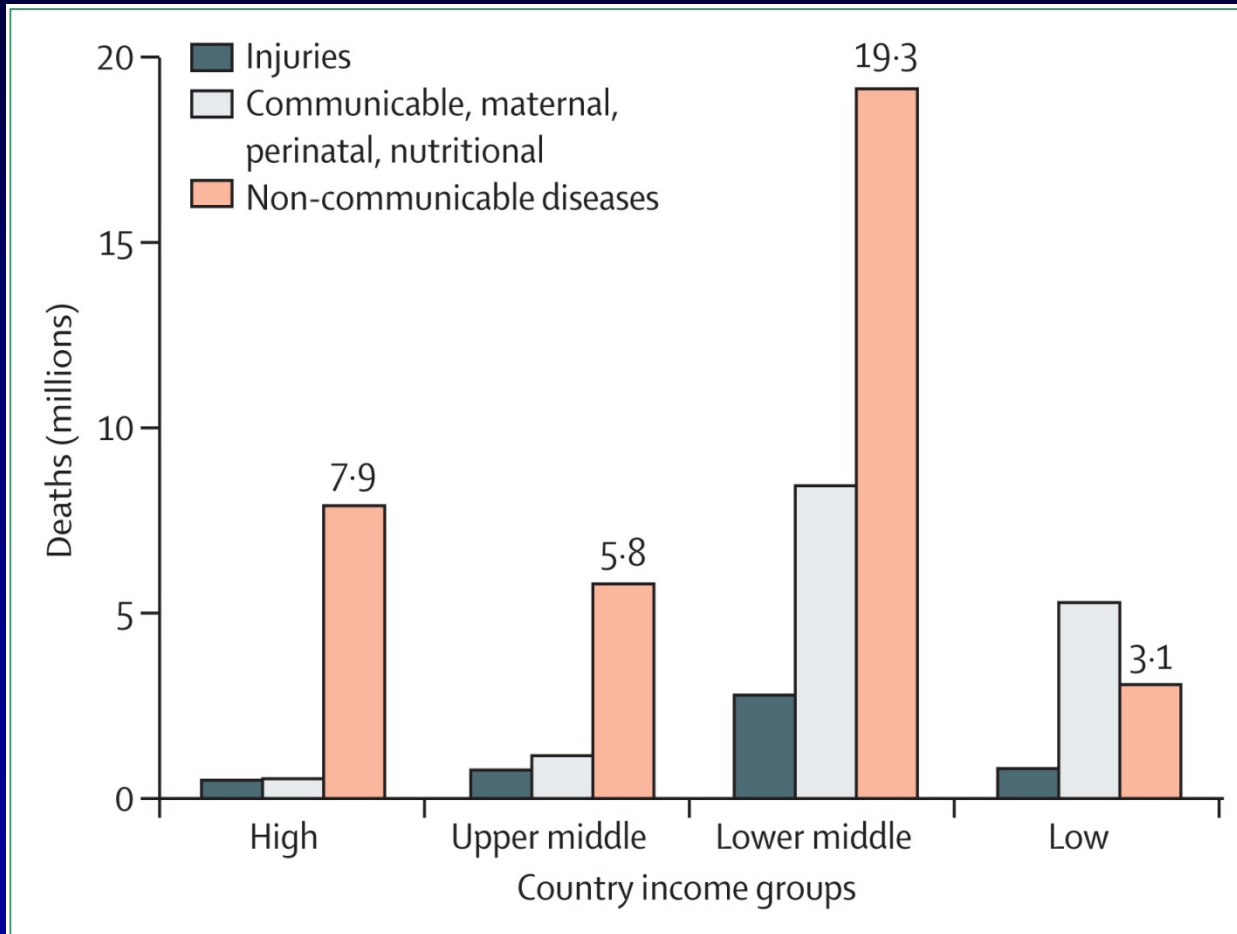


Figure 1: Broad cause of death in countries, by World Bank income groups, 2008⁴

Source:

Beaglehole R, Bonita R, Alleyne G, et al for the Lancet NCD Action group. UN HLM on NCDs: Addressing four questions. Lancet 2011 POL June 13 2011

NCDs: Economic Impact

| NCDs accounted for five of the six top causes of economic loss in 2008

H Heart disease : \$752bn

H Stroke: \$298bn

H Diabetes: \$204bn

NCDs cost developing countries up to 6.77% of GDP; this economic burden is more than that caused by Malaria (1960's) or AIDS (1990's) - IOM Report 2010

NCDs will lead to a loss of **30 Trillion Dollars** globally up to 2030 representing 48% of global GDP in 2010

— Harvard + WEF Study 2011

Burden of Disease and Causes of Death



Burden of Disease

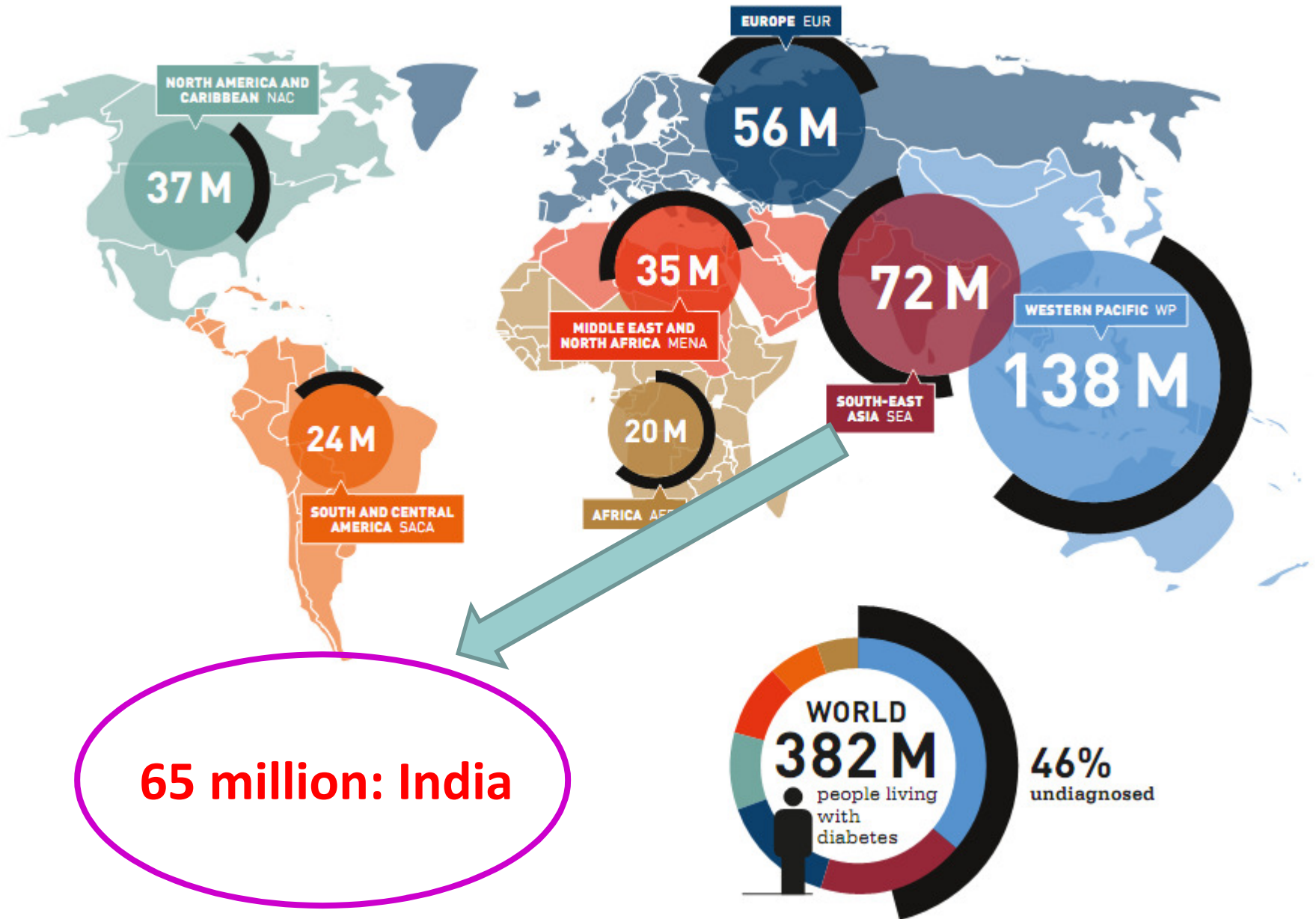


Main Causes of Death



Sources: Report on Macroeconomics and Health in India (Burden of Disease in India, Background Papers) 2005; India Health Beat – a publication of WHO & Public Health Foundation of India (Jun 2012 Issue)

Number of people with diabetes by IDF Region, 2013



Trends in DM Prevalence

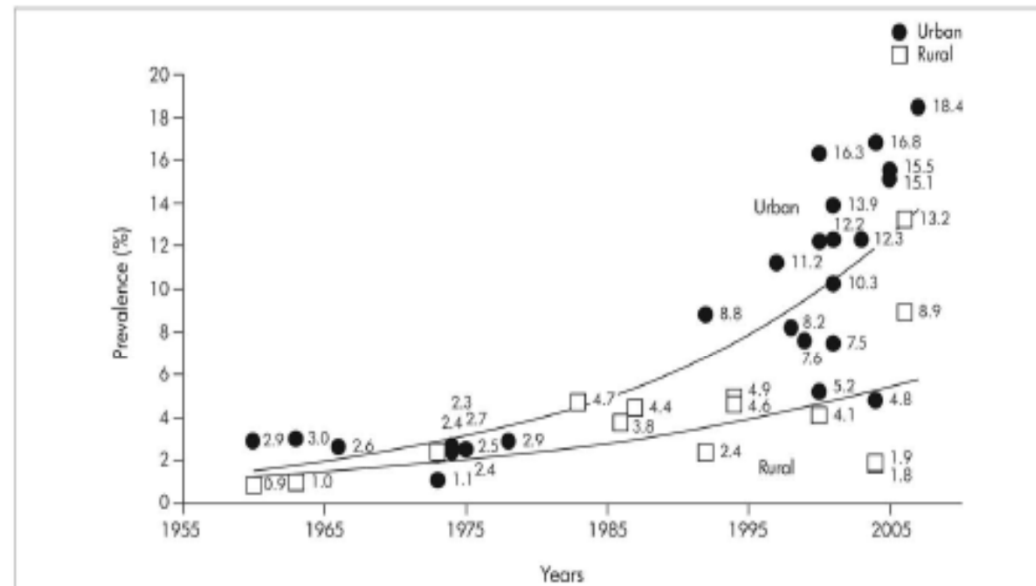


Figure 2. Trends in the prevalence of diabetes mellitus in Indian urban and rural populations. A significantly increasing trend is apparent in urban populations (exponential trend $R^2 = 0.76$). Among rural populations, the prevalence is increasing at a slower rate ($R^2 = 0.43$) but has accelerated recently.

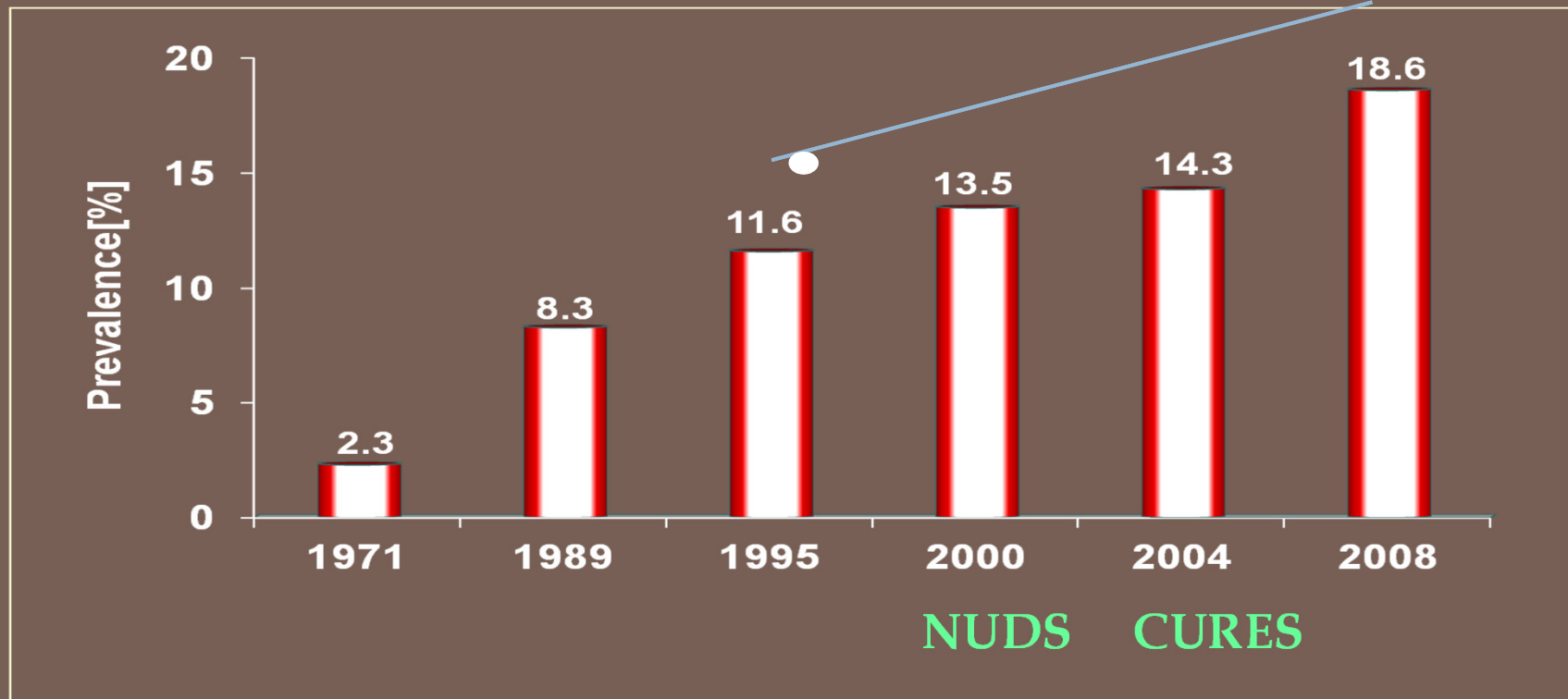
Professor Ahuja's Studies:

1972: Urban Delhi - 2.3%

1991: Urban Delhi - 6.7%

Rising Prevalence of Diabetes in Urban India

Over 14 years, DM prevalence increased by
72.3%



Prevalence rate - age standardized for Chennai Census 1991

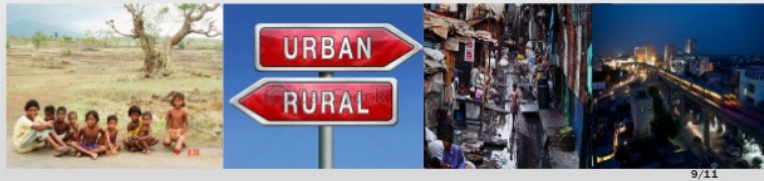
Mohan et al, *Diabetologia*, 2006; 49: 1175
Ramachandran et al, *Diabetes Care*, 2008; 31: 893

Socio-Demographic-Nutritional Transition

URBANIZATION

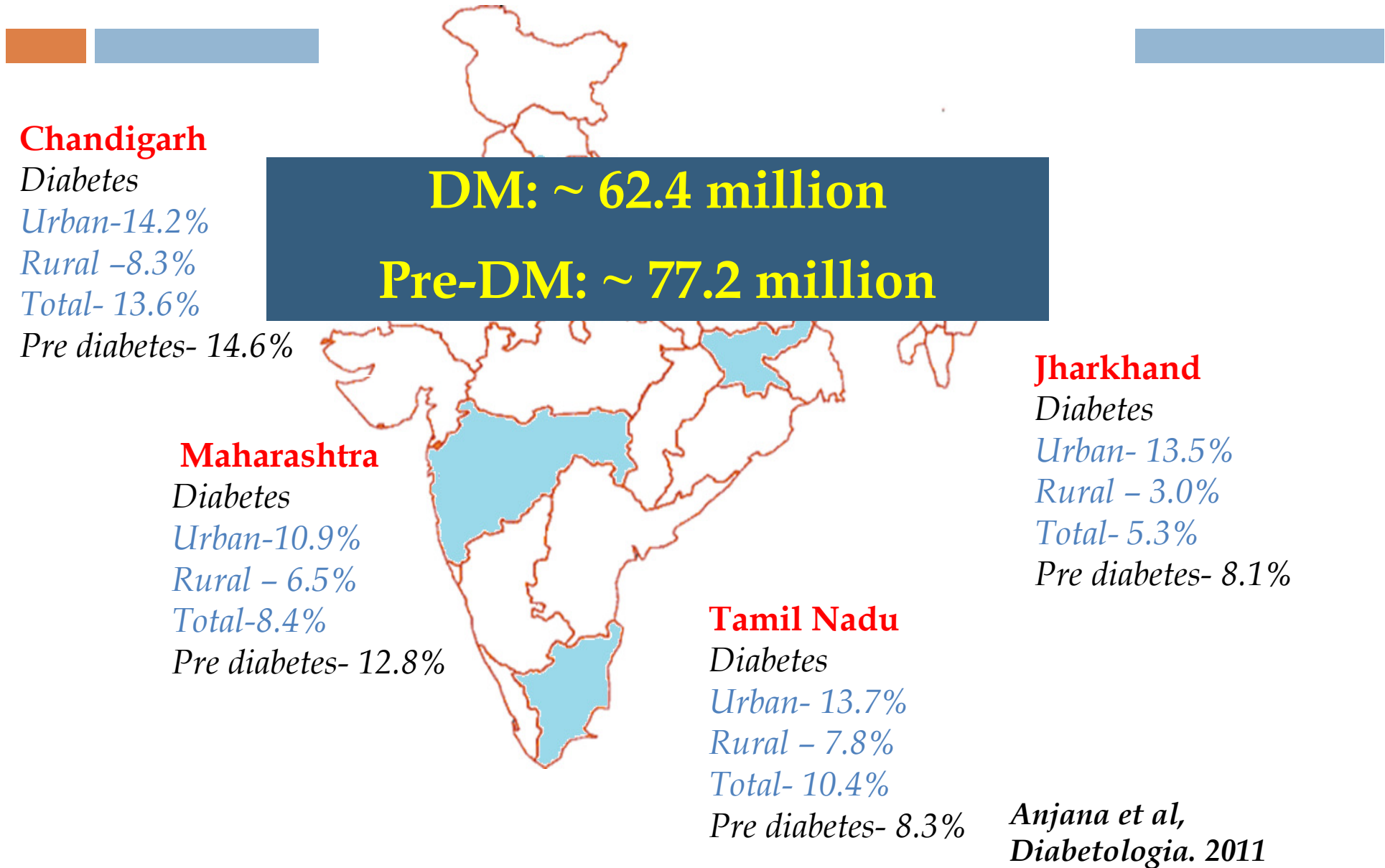
CENSUS 2011	Rural Population (millions)	Urban Population (millions)	Increase in Urban population (%)
INDIA	833.1	377.1	3.35

- ❖ Mass migration of rural population into urban centers resulting in increasing the urban population & growth of cities.
- ❖ **Cause of urbanization: "MIGRATION" d/t-**
 - Better employment opportunities.
 - Better living standards.
 - Better availability of social services like Education, Health, Transport, Entertainment etc.



ICMR- INDIAB study-Phase-1

Weighted Prevalence of DM and Pre-DM



CARRS Surveillance STUDY

Features:

- Largest Cohort modeled surveillance study in South Asia
- **> 10,000 individuals from randomly chosen representative communities of Delhi and Chennai**
- 20+ years, both genders, stratified for residence and location

	Chennai		Delhi	
	Male	Female	Male	Female
	%	%	%	%
Diabetes	20.0	20.8	22.3	19.8

Age-wise prevalence

Chennai and Delhi

	Chennai		Delhi	
Age (years)	Pre-DM (%)	DM (%)	Pre-DM (%)	DM (%)
≤24	5.0	0.3	21.3	0.0
25-34	15.7	5.2	32.5	4.3
35-44	21.2	14.9	42.1	10.9
45-54	24.4	28.8	41.5	23.8
55-64	18.6	39.7	34.7	35.6
≥ 65	21.0	45.3	37.8	36.4


What About Young India...



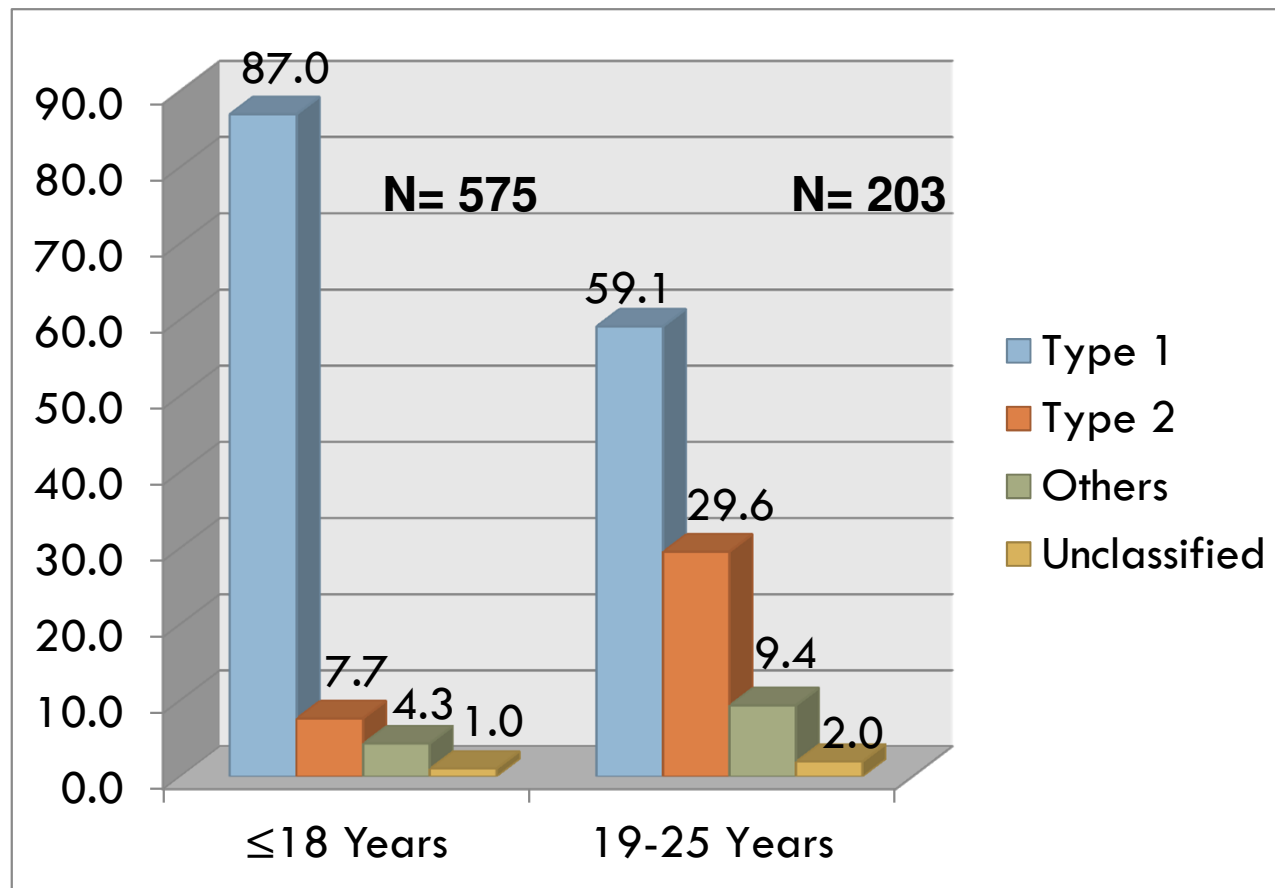


ICMR Young Diabetes Registry

Type of diabetes		Data between 1/9/13 to till date (N = 734)	
Type 1	Public Hospital	638 (86.9)	Phase-I
Type 2			1125 (88.9)
LADA	Private Hospitals	2 (0.3)	103 (8.1)
MODY		5 (0.7)	2 (0.2)
MMDM		0 (0.0)	3 (0.2)
Gestational Diabetes		11 (1.5)	0 (0.0)
Drug Induced Diabetes		4 (0.5)	10 (0.8)
Chronic Pancreatitis		7 (0.9)	7 (0.6)
Secondary Diabetes & Others		1 (0.1)	8 (0.6)
Total		734	8 (0.6)

- 
- In two centres, almost 40% of young diabetics were type 2!!
 - So diabetes is hitting Indians earlier...

Youth onset (<25 yr) diabetes at Medanta Medicity (N=778, 2010-15)



T1DM vs. T2DM at onset (Medanta data)

	Type 1 (n=467)	Type 2 (n=77)
Male: Female	1.4:1	2:1
Age at onset*	12.4±6.6	19.4 ±4.2
Family h/o T2*	244 (52.2%)	69 (89.6%)
3 or more family members with T2*	37 (7.9%)	30 (39%)
Osmotic symptoms*	408 (87.4%)	41 (53.2%)
Weight loss*	381 (81.6%)	32 (41.6%)
Ketosis*	243 (52%)	3 (3.9%)
Incidental diagnosis*	13 (2.8%)	19 (24.7%)
Other presentations*	17 (3.6%)	18 (23.4%)
BG at onset*	475 ±139	364 ± 125
Positive GAD antibody*	32/57 (56.1%)	1/15 (6.7%)
Fasting c peptide* (ng/mL)	0.62 ± 0.55	2.2 ± 2.1

Migrant south Asian people have a two to four-times higher risk of type 2 diabetes and develop diabetes 5–10 years earlier than do white European people

Sattar, Lancet 2015

Body mass index

22.3

22.3



Body fat

9.1%

21.2%

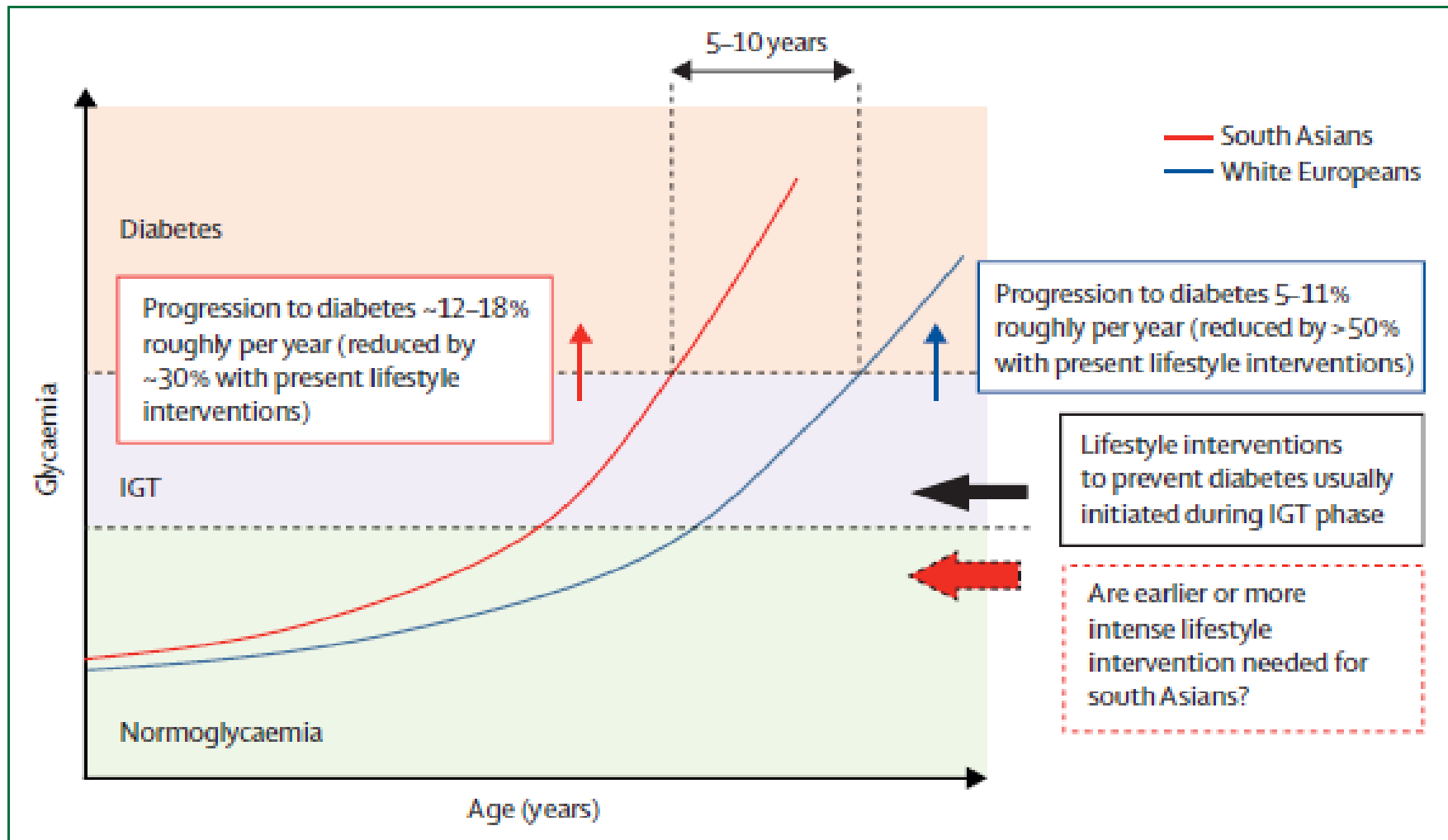


Figure 2: Glycaemia over the life course and the effect of lifestyle intervention on diabetes progression in south Asians and white Europeans

South Asians develop diabetes about 5–10 years earlier than do Europeans and have more rapid progression from impaired glucose tolerance to overt diabetes. IGT- impaired glucose tolerance.

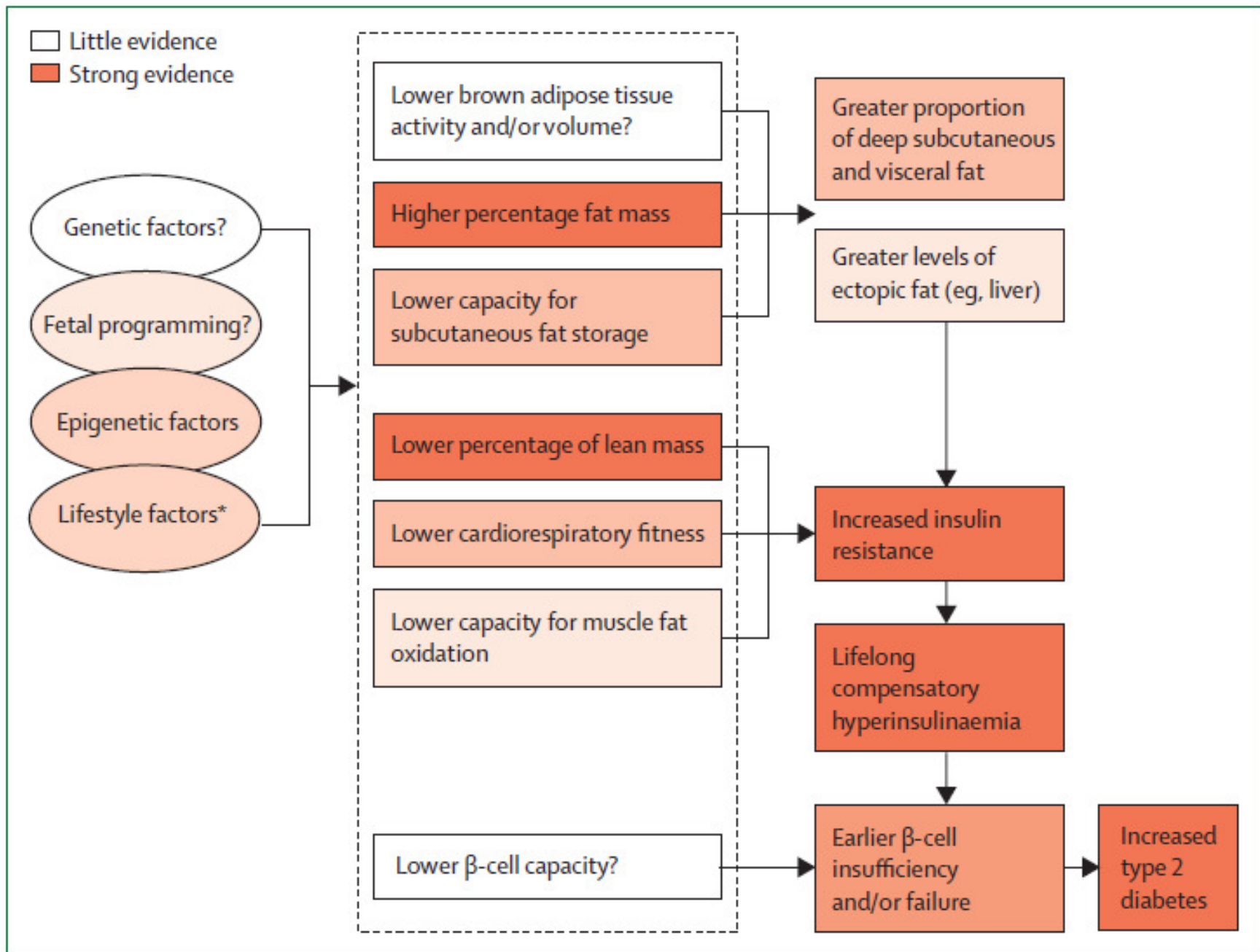


Figure 3: Hypothesised mechanisms for increased type 2 diabetes risk in south Asian people



Diabetes and India: the historical connection

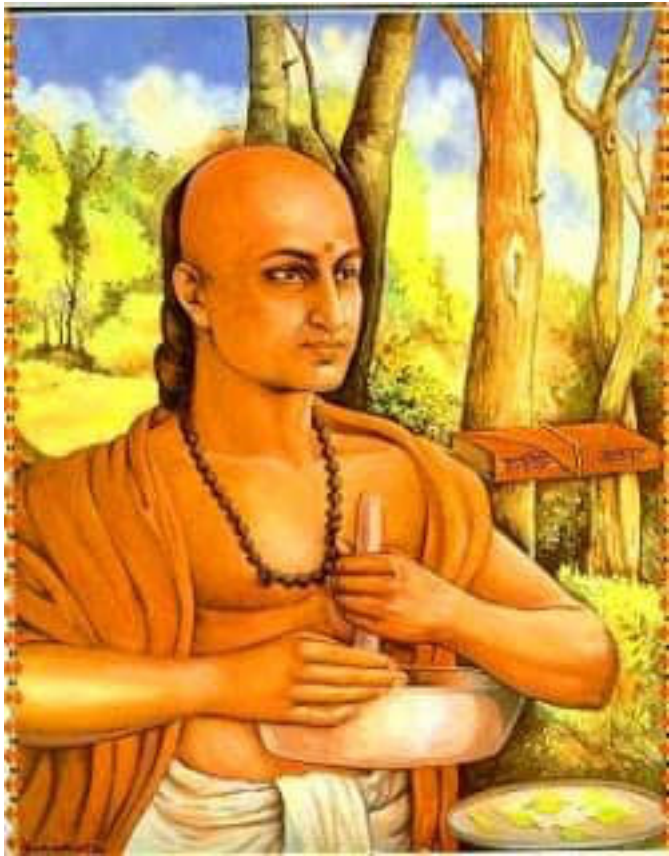
The etymology of sugar can be traced to the Sanskrit '*sarkara*' meaning gravel.





Alexander's army was amazed to find a 'non honey' source of sweetness in India and introduced it to the world

Is Diabetes A New Problem In India?

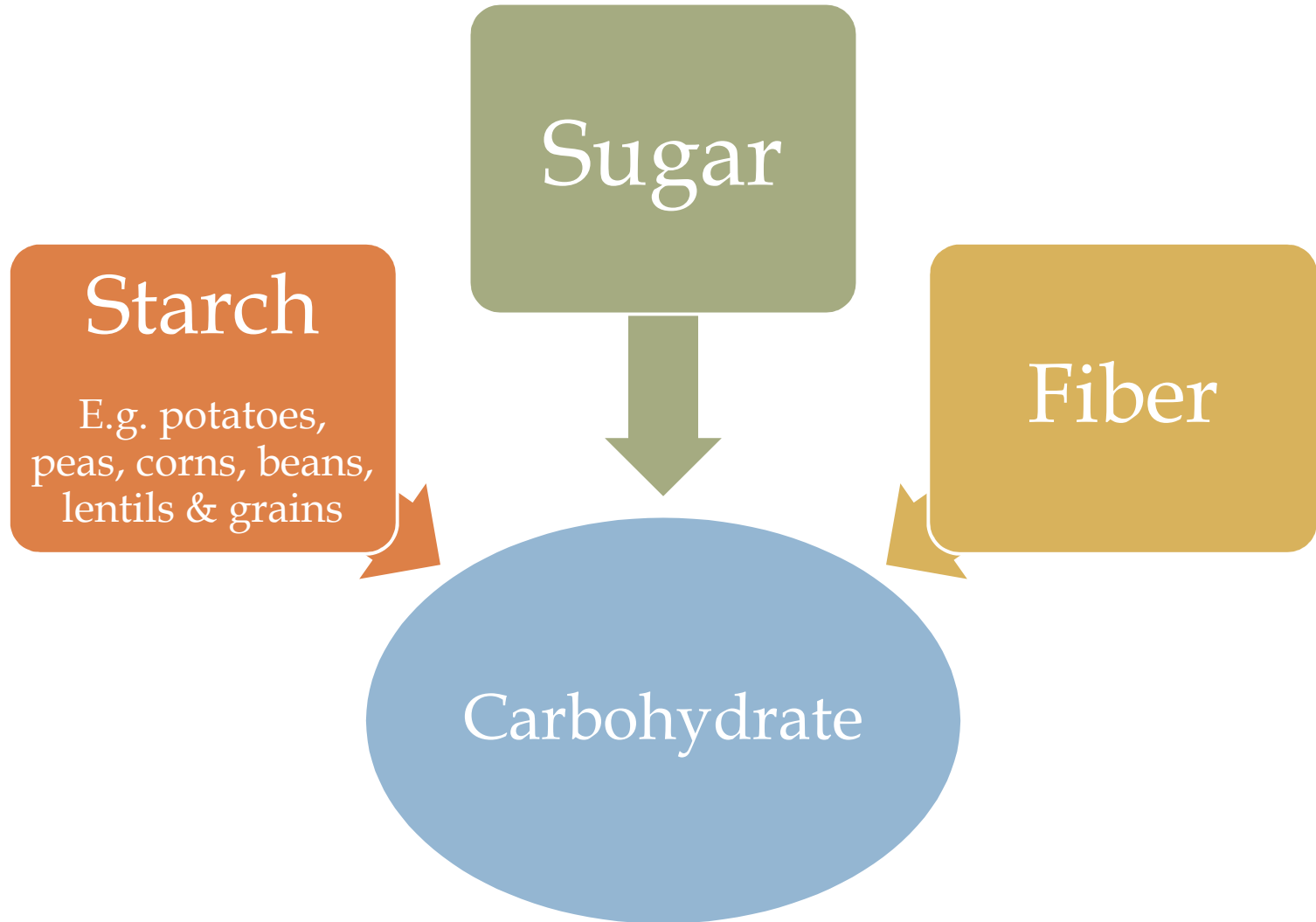


- In 1500 BCE, Indian physicians described “*madhumeha*” – *sweet urine*.
- Charaka described the disease in detail and distinguished between childhood diabetes or Type1 DM from adult diabetes or Type 2 Diabetes.



Dietary Factors Contributing to Diabetes

Main Source of Energy: CARBOHYDRATES



Sugar



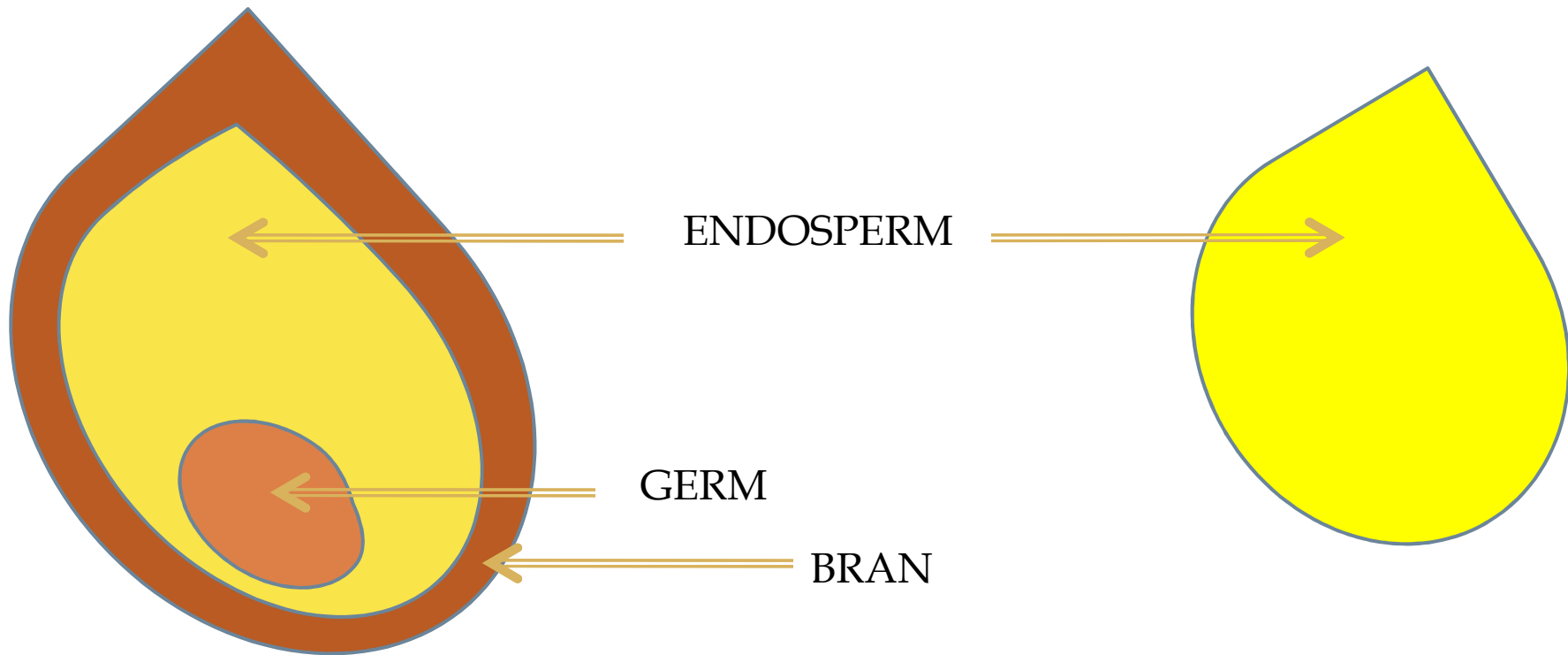
- ***Consuming sugar is considered to be the equivalent of smoking.***
- While honey and jaggery are perceived to be more 'natural', they provide about the same amount of calories as cane sugar.
- In terms of calories fruit juice is as bad as colas- a can of cola contains about 140 calories, and an equivalent amount of apple juice contains about 160!

Whole Grains v/s Refined Grains

Whole Grains

v/s

Refined Grains



- Bran- rich in vitamins, mineral & fiber
- Germ - rich in essential fatty acids & Vit E
- Endosperm- rich in starch

Effect of Refined Cereals/Sugars



Refined Cereals & Sugar

Rapidly Metabolized

Poor Satiety

High Calorie Intake

Blood Glucose — ↑ Insulin Secretion

DIABETES & OBESITY

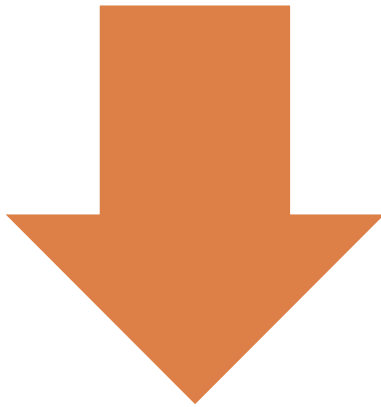


Wheat

- Cultivation thought to have started in Mediterranean/ Central Asian region
- Reached India around 6,500 BCE.
- Staple for 1/3rds of earth's population.
- 20% of total calories/ protein



Sift the Wheat from the Chaff




Fact

- Consume whole wheat including the fiber rich bran and mineral rich germ layer
- Nutritious, absorbed slowly and does not stimulate appetite

Wheat Belly

- High GI, stimulates appetite
- Weight Gain & Diabetes





Presence of lethal peptides such as Amylopectin A, that forces people to overeat.

Scientific evidence of wheat addiction and overeating is not convincing.

No grain with a 'killer' peptide could have been consumed for centuries.

Rice: Different Varieties



WHITE RICE

- High GI
- Less Fat
- Low in Fiber



RICE FLAKES

(poha)

- High GI
- High in Iron



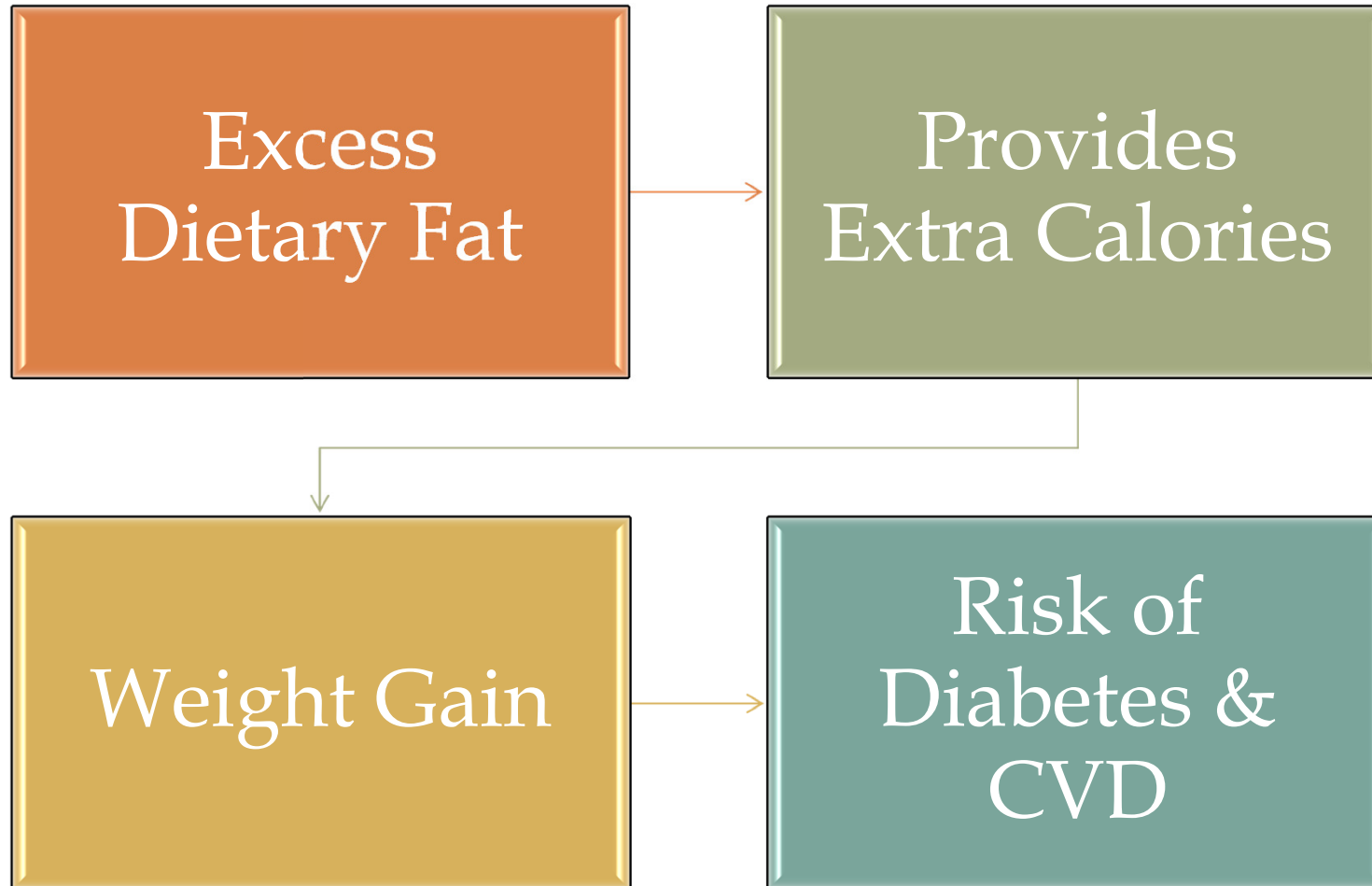
BROWN RICE

- Moderate GI
- Less Fat
- High in Fiber

*SUGARS & CARBOHYDRATES is not all you should watch out
in a hearty meal ...*



...Fat Could Impact Too!





Sugar substitutes

Sugar substitutes



- **Artificial sweeteners:** synthetic sugar substitutes- include saccharin, cyclamate, aspartame, sucralose, acesulfame and neotame.
- **Sugar alcohols:** Low calorie sugar alcohols (they don't contain alcohol!) like erythitol, mannitol, sorbitol are derived from plant sugars. Sugar alcohols also add some texture to food.

Sugar substitutes

- Using artificial sweeteners may provoke a sense of complacency and drive us into eating other high calorie food more liberally.
- It is common to see people digging into their brownies and pizzas but taking extra care to order only diet colas.
- *“No sugar” labels can be misleading!*



Thank You